WASTEWATER TREATMENT
CAPITAL IMPROVEMENT PROGRAM

Introduction to Program, Program Goals, and Key 2003-2008 Issues

The mission of the Wastewater Treatment Division is to protect public health and the environment by conveying and treating the region's wastewater. Since 1958, when King County citizens voted to build a regional wastewater system to clean the polluted waters of Lake Washington & Puget Sound, we have helped to dramatically improve water quality, while recycling and reusing natural resources.

The WTD Capital Improvement Program for 2003 - 2008 is based on compliance with current regulatory standards for secondary treatment of wastewater and combined sewer overflow events. The objectives of the capital program are to:

1. Ensure continued operation and reliability of existing wastewater conveyance and treatment assets;
2. Enhance regional water quality in compliance with federal, state and local regulations; and
3. Ensure sufficient capacity to meet the long-term needs of the regional service area.

Attaining these objectives is the basis of the projects included in the 2003 CIP budget.

In June 2001, the King County Council passed the Wastewater Flexible Budgeting Ordinance (King County Code 14122) creating a budgeting process for the Wastewater Treatment Division CIP program. This comprehensive ordinance defines a process framework allowing the division the flexibility needed to achieve its mission, as well as providing accountability for the budget. The 2003 WTD CIP budget request is the second budget submitted under the flexible budgeting ordinance. In accordance with the ordinance, the spending authority for most capital projects is appropriated at the fund level in the 2003 budget. The remaining minor asset management projects are appropriated at the category level, as described below. This allows for the flexibility of transferring funds among projects within the appropriation category, subject to reporting requirements, and to react to special circumstances as they occur. In each case, only one year of budget authority is appropriated. Additionally, the full term of multi-year construction contracts is appropriated in the first year of the contract. It should be noted that the inclusion of the full contract value in one year gives rise to fluctuations in appropriation requests over time. For example, a large multi-year contract will increase the appropriation in the first year relative to the subsequent years.

WTD makes an important distinction between appropriation and expenditure. The appropriation is the amount for the indicated year including the (1) expenditure for that year plus (2) full contract terms, minus (3) previously appropriated expenditure. The planned expenditure is the amount expected to be spent in the indicated year.

The WTD CIP appropriation request for 2003 is $264,850,598. As described in the following table, this appropriation request consists of projected 2003 expenditures of $275,388,000; $39,134,234 in out-year expenditures associated with construction contracts going to bid in 2003; allowance for $71,121,271 of previously appropriated 2003 expenditure; $8,221,037 in previously appropriated grant-backed expenditure, and $29.7 million in appropriation for Brightwater land purchase.

Wastewater Treatment Division

2003 Appropriation Request

	Requested Appropriation
WTD Capital Projects	251,009,298
Minor Asset Management Categories	
Structure and Site Improvements	1,800,597
Mechanical Equipment	3,138,298
Odor and Corrosion	672,850
Pipeline Replacement	2,147,059
Process Replacement / Improvement	2,940,781
Electrical, Instrumentation and Control	3,141,715
Total	**264,850,598**

The components of the 2003 appropriation request are presented in the following table.

Wastewater Treatment Division

2003 Appropriation Request by Component

	Requested Appropriation
2003 Total Expenditure	275,388,000
plus: construction contracts, 2004-08 amount	39,134,234
plus: 2003 land purchase, 2004 amount	29,670,672
Minus: previous grant-backed appropriation	<8,221,037>
Minus: previously appropropriated 2003 expenditure	<71,121,271>
Total	**264,850,598**

Project Prioritization Methodology

WTD is undertaking a comprehensive examination and revision of our project prioritization process. In this effort we are examining industry best practices and expanding the elements used in creating a distribution of prioritized projects. Currently, priority designations are assigned according to the relative importance of individual projects in meeting the objectives of the Wastewater Treatment Capital Improvement Program, and are defined as follows:
Priority 1: Projects are directly related to the operations of the treatment of wastewater as defined by the core business operations plan and which respond to regulatory requirements.

- Projects that increase the system capacity brought about by overloading conditions.
- Projects required because of federal, state, and local rules and regulatory requirements. Projects within this class will sort on the premise that projects are responding to A) existing rules and regulations or B) new emerging rules and regulations.
- Projects in which a regulatory violation is preventable. Project safeguarding against loss of life, likely source of injury, health hazard for either employees or citizens, or a high probability for major property damages.
- Projects which result in increased worker safety.

Priority 2: This is a class of projects designed to protect, support and maintain existing investments in the County's infrastructure and priority 1 projects.

- Projects designed to protect, enhance and maintain existing investments in the County's infrastructure, not generally resulting in a new structure.
- Projects responding to manufacturers recommended maintenance requirements.
- Projects resulting from component failure, e.g., loss of structural integrity of essential components, or extensive component deterioration and probable failure within 5 years.
- Projects that rehabilitate deteriorated components forecasted within 5 years.
- Projects that eliminate likely minor property damage.
- Projects resulting in major component deterioration with failure within 10 years.
- Projects which eliminate "backsliding" in the adopted CSO Plan. For example, CSO event/volume than established baseline, such as sewer overflows in a separated system.

Priority 3: These projects plan and provide for new services and expansion.

- Projects that plan and provide for new services and system expansion.
- Projects designed to enhance community development as called for in the comprehensive plan.
- Projects that will result in improved technology and efficiency and have a payback potential within 5 years.
- Projects that relieve system downtime moderate component deterioration, or overloaded condition causing failure within 5-10 years.

Priority 4: These projects provide for demonstration and experimental technologies.

- Projects supporting on-going demonstration programs.
- Projects enhancing operation and maintenance of existing water/environmental quality programs, and public support for proposed action.
- A project that maintains or expands King County's good neighbor policy and maintains the existing service levels.
- Projects that have public support; increased desired service levels/reliability with minimal capital investment.
- Projects which support Executive/Council commitments to other agencies.
- Projects that result in improved water quality in critical areas.

Growth Management and Comprehensive Plan Issues

The long-term priority of the Wastewater Capital Improvement Program is to identify and provide the facilities and services needed to support the continuing vitality of the Puget Sound region. Both King County and Washington State Code require sewer comprehensive plans for all entities that provide sewage collection and treatment. These plans must include specific information such as a capital facilities inventory, and must also undergo a formal public review process. The Washington State Growth Management Act (GMA) further requires King County to forecast the amount of wastewater infrastructure necessary to serve growth within the urban growth boundary, and to have this infrastructure available when growth occurs. The

Metropolitan King County Council adopted the RWSP, a supplement to the King County Comprehensive Water and Pollution Abatement Plan, in November 1999. The adoption of the RWSP defines the policy basis for the capital improvements necessary to provide wastewater services to this region for the next 30 years. The RWSP utilizes the same assumptions with regard to future population and employment levels in the Puget Sound region as does the Growth Management Act and the King County Comprehensive Plan. When originally presented to the Council for adoption, the RWSP included an up-to-date inventory of existing facilities, a level of service definition, and an identification of needs to support the regional vision adopted under the Growth Management Act and the King County Comprehensive Plan.

Financial Planning and Policy Overview

The Wastewater Capital Improvement Program is funded primarily through proceeds from bond sales, short-term borrowing, transfers from the operating fund and capacity charge revenues. The operating fund derives the majority of its revenue from monthly charges to sewer customers that are collected by WTD's component agencies. Transfers from the operating fund to the capital program are the result of the financial policy requirement of maintaining a debt service coverage ratio of no less than 1.15 of all debt. In June 2002 the Metropolitan King County Council adopted a monthly wholesale sewer rate of $23.40 and a capacity charge of $17.60 for 2003.

The 2003 capacity charge is based on the new capacity charge methodology passed by King County Council in Ordinance 14129 in October 2001. The methodology contained in Ordinance 14129 was designed to provide an equitable base for allocating the costs of the wastewater treatment system to the customers that use it. Specifically, it enacts the RWSP policy of growth paying for growth by ensuring new customers bear their equitable share of the cost of new capacity in the system. Cash flows generated by these revenue sources are sufficient to fund the accompanying appropriation request while fully complying with WTD's financial policies.

Green Building Initiative

WTD is actively supporting the King County Green Building Initiative. In this pursuit, the actions have been initiated or completed:

- WTD staff has been appointed to serve on the King County Green Team.

Presentations have been made to project managers and other WTD groups about the Green Building Initiative, Leadership in Energy and Environmental Design, and how project managers can support the initiative.

- Development of a Green/Sustainability Notebook of information and resources for project managers.
- Survey of major capital and asset management project managers requesting input from project managers about what would help them implement green projects.
- Funding of the Environmental Building Newsletter and several other sources of information to help project managers implement the initiative.
- Sample green building language for project managers to use in their Request for Proposals and Scopes of Work.
- An article in the DNRP Resources about green building.
- Development of a WTD Green Team to pursue work items requested via the project managers surveys.

The WTD Green Team work items supporting the Initiative will include (but are not limited to): revising WTD specifications to include green language; presentations on green materials, projects, and lessons learned; WTD Guidelines for implementing the initiative; on-call LEED certified professional; WTD green website; and field trips to green projects.

Wastewater Capital Budgeting

King County Wastewater Treatment Division uses a consistent and systematic approach across the division to develop initial project budgets and update existing budgets. The following section provides an overview of the project budgeting process, including assumptions for inflation and project contingency.

The initial project budget is almost always derived from a planning level budget estimate. These estimates are prepared early in the life of the project and provide the expected capital construction or implementation costs. These estimates are based on: (1) the project scope as it is known at that time, (2) industry standard pricing and contingencies, (3) historical project comparisons, (4) in-house and/or consultant experience, and (5) benchmarking, estimating programs, and in-house construction cost models.

The capital cost estimate is used to derive additional project costs, including planning, engineering, construction, right-of-way/land acquisition costs, staff labor and overhead costs. Using extensive historical information and management input, the parameters and standards used in allocating these additional costs vary according to such things as: (1) the size of a project, (2) whether engineering is performed by County staff or consultant, and (3) whether construction management is performed by County staff or consultant.

The result is an overall project budget including details on schedule, construction costs, engineering costs, staff costs, overhead costs and Right-of-Way/Land Acquisition costs. This budgeting model produces detailed cash flow information by year and project phase in addition to detailed staffing information by phase and cost center or year and cost center. This budgeting model was used system-wide for the first time in 2002. The Wastewater Treatment Division will continue to improve the model over time.

Program Contingency

Program contingency provides an element of flexibility in reacting to changing circumstances across the entire CIP program. For the WTD CIP program contingency is defined as 7.5 percent of the appropriation-year cash flow or $10,000,000, which ever is less. Program contingency is identified as a single project and can be found under the Central Functions tab of this document. In 2003, the program contingency is $10,000,000.

Inflation Assumptions

The WTD CIP contains a large number of multi-year projects in which price changes over time affect the cost of materials and services. There are many sources of inflation and prices do not always change at the same rate, for example, the cost of construction may increase relatively fast reflecting a strong local construction market. The WTD CIP assumes general prices change at 3 percent per year during the 2003-2008 period. This does not reflect a projection of any single inflation index but reflects a reasonable aggregate rate of increase for the next 6 years, based on the historical activity of both construction and non-construction price indices. Indices tracked include the Consumer Price Index, Implicit Price

Deflator, the ENR Construction Cost Index and the Turner Building Cost Index.

Project Contingency Assumptions

Project contingency is added to a project to explicitly reflect the uncertainty about the future and as a buffer against the risk of under-funding a project. In WTD, CIP project contingency is calculated using standards recommended by the Association for Advancement of Cost Engineering (AACE) recommendations. The typical WTD CIP project goes through five phases, with each successive phase representing more complete and detailed project information. The five phases include planning, predesign, design, construction, and closeout.

In the calculation of project contingency, the percentage of total project cost is specified according to the current phase of the project as follows:

Project Phase	Percent contingency
Planning	30
Predesign	30
Design	20
Construction	10
Close out	0

The contingency is based on total project cost and entered in the closeout phase of the project. As the project moves through the phases, the contingency amount will decrease reflecting the improvements in project definition and expected accuracy of the data.

Project Categories

Capital projects carried out by the Wastewater Treatment Division are grouped according to the major functions they serve in the wastewater system. There are thirteen functional categories in all. The spending authority for the first twelve of these categories is pooled at the fund level. For the thirteenth category, Minor Asset Management, the spending authority is defined at the level of the sub category.

1. South Treatment Plant
2. West Point Treatment Plant
3. Brightwater Treatment Plant
4. Vashon Treatment Plant
5. Conveyance pipes and storage
6. Conveyance pump stations
7. Combined Sewer Overflow (CSO) control
8. Infiltration and inflow (I/I) control
9. Biosolids recycling
10. Water reuse
11. Environmental Laboratory
12. Central functions
13. Minor asset management

Project Subcategories

To help make it easier to track projects we have further grouped them into four primary subcategories: (1) asset management, (2) new facilities, (3) odor control, and (4) power management. Most wastewater capital projects fall under either asset management or new facilities, so the odor and power

management categories were added to logically differentiate the projects.

Asset Management

King County has many responsibilities as a regional wastewater service provider. It must protect the health and safety of the public and the environment, dependably collect and treat wastewater from 34 local sewer agencies, meet the terms of NPDES permits, and protect the $3.6 billion investment in its existing wastewater system. To fulfill these responsibilities and ensure the system has the flexibility to meet future demands, the County must maintain and periodically update its wastewater assets. In general, the asset management projects reported in this subcategory are part of the Facilities Inspection Program, which through routine inspections and maintenance is intended to extend and optimize the "useful life" of WTD assets, including facilities, structures, and pipelines. Accordingly, these projects vary widely in scope, ranging from replacing pavement to replacing the roofs on digesters.

New Facilities and Improvements

In addition to the responsibilities mentioned above, King County must provide the necessary wastewater capacity to serve the rapidly growing population in King and south Snohomish County. Forecasts predict that over 1 million new people will be living and working in King County by 2030, generating an additional 54 million gallons of wastewater each day. The Washington State Growth Management Act requires the County to have infrastructure available to serve this growth, and the recent amendment to the Comprehensive Water Pollution Abatement Plan (the Regional Wastewater Services Plan) is the vehicle for meeting this requirement. The RWSP identified about $1.7 billion in new wastewater capital projects to be constructed in the next 30 years, including the new 36-mgd Brightwater Treatment Plant, a marine outfall, several large conveyance pipes, and 22 CSO projects.

Odor Control

Hydrogen sulfide (H_2S) results from the natural decomposition of organic material in raw sewage, especially in enclosed areas like pipes and holding basins. This colorless gas has an unpleasant rotten egg odor and when combined with water in sewage pipes form sulfuric acid, a compound that corrodes concrete pipes and degrades their structural integrity. Projects in this category are aimed at controlling the odor caused by hydrogen sulfide gas and thus limiting corrosion, as well as improving air quality around the facilities. Examples include odor studies and constructing or upgrading odor control facilities.

Power Management

There are two main types of power management projects. Projects of the first type are designed to provide reliable power for safe and dependable wastewater service. The sewage backups and overflows that occurred during the widespread power outages caused by the Holiday Storm of 1996–97 highlighted the need for standby generators at additional pump stations and treatment plants. Power is also made more reliable by upgrading existing equipment such as pump motors, switches, meters, and transformers. The second type of projects conserve energy and provide quantifiable, long-term savings in energy costs. An example of this type of project is co-generation, where methane gas captured from the treatment process is used to power generators that would otherwise require electricity.

Council Adopted Changes

Council added the following project to the 2003 Wastewater CIP:

- *Septic System Conversion Pilot Project - $100,000*

Council also reduced funding from the Wastewater CIP projects listed below:

- *STP Dewatering Equipment Replacement – ($50,000)*
- *CP&S RWSP Conveyance System Improvements – ($100,000)*

Council Provisos

PROVIDED THAT:

Of the appropriation for CIP project 423484, Brightwater Treatment Plant, $6,572 shall be expended only as a transfer to the King County auditor for studies evaluating the financial and programmatic management of current and planned wastewater treatment division CIP projects, to include the Brightwater Treatment Plant. This transfer is in addition to $75,000 in wastewater treatment division CIP funds transferred from CIP project 423484 to the auditor's office in 2002 to conduct studies of financial and programmatic management.

PROVIDED FURTHER THAT:

Of the appropriation for CIP project 423373, CP&S Regional Wastewater Services Plan Conveyance System Improvements, $6,572 shall be expended only as a transfer to the King County auditor for studies evaluating the financial and programmatic management of current and planned wastewater treatment division CIP projects, to include conveyance system improvements. This transfer is in addition to $75,000 in wastewater treatment division CIP funds transferred from CIP project 423373 to the auditor's office in 2002 to conduct studies of financial and programmatic management.

PROVIDED FURTHER THAT:

$50,000 of the remaining appropriation for CIP project 423536 – South Treatment Plant Microwave Co-Generation will be spent only on the removal of testing equipment associated with this project from the South treatment plant property.

PROVIDED FURTHER THAT:

Of this appropriation for new CIP project xxxxxx, Septic System Conversion Pilot Project Fund 4616, $100,000 shall be expended or encumbered solely on a pilot project to provide funds to local sewer agencies in the King County wastewater service area to extend their infrastructure or to provide low-interest loans to homeowners to facilitate the conversion of homeowner septic systems. Such systems must be within the urban growth area of King County only. An additional amount of up to $400,000 from surplus wastewater capital funds previously appropriated may also be expended on this project.

PROVIDED FURTHER THAT:

Of this appropriation, $3,000,000 in CIP project 423351 are to only be transferred to fund 3160, Parks, Recreation and Open Space.

CIP Program Accomplishments and Completion Lists

Projects Completed in 2001

A10011 - CAPITAL ASSET MANAGEMENT

423169	CSO PROGRAM
423170	WW2020
423228	Misc. Odor Control/H2S
423242	Misc. Facilities Improvement
423250	Misc. Power Reliability
423481	Misc. Paving Replacement
423360	BACKUP STEP SCREEN
423476	DUWAMISH & WILBURTON PS PAVEMENT

A10025 - OTHER FACILITY IMPROVEMENTS

423322	OIL/WTR REMOVAL FRM DIGESTER GAS
423329	STRENGTHEN PANEL CONNECT AT DIGESTERS
423374	WPTP - INSTALL EPS #4
423401	WPTP SOLIDS BLDG ISO VALVES
423451	WPTP HILLSIDE RETAIN WALL DRAINAGE SYS REPLACEMENT

A10031 - TRANSMISSION FACILITY IMPROVEMENTS

423110	CEDAR RIVER TRUNK
423111	CEDAR RIVER PH3
423115	EASTSIDE FLOW MONITORING

A20010 - SOUTH TREATMENT PLANT ASSET MGMT

423291	STP - E. & W. Primary Roof Replacement
423482	STP LARS2
423496	STP Septage Scale
423502	STP Bowker Building Lift Station
423511	STP Balker Building Pave. Replacement.
423196	STP Misc. Coatings & Sealant
423543	SOUTH PLANT RAW SEWAGE PUMP VFD INSTALLATION

A20020 - SOUTH TREATMENT PLANT-NEW FACILITIES

423232	STP Centrifuge - Renton Dewatering
423501	STP Admin. Facility Expansion
423536	STP Microwave Power Co-Generation

A20110 - WEST TREATMENT PLANT- ASSET MGMT

200011	WTP Anoxic Gas Flotation Demo
423315	WTP - Develop Routine Test Procedures
423325	WTP - Expansion Tank Alarm Switches
423337	WTP - SCS/PLC Plant Enhancements
423342	WP POST CONST MONITORING
423375	WTP - Waste Gas Burner
423389	WTP - Ferric/Caustic Containment Piping
423411	WTP Health/Safety/Fire/ Dryer Modifications
423447	WTP SIF Closeout - KC Const. District. Marra
423546	West Point Digester HVAC Improvements

A20130 - WEST TREATMENT PLANT ODOR CONTROL

423321 WTP Digester Foam Removal/Odor Control

423324 WTP Process Cleanings w/ Odor Control

423410 WTP Thermophilic Digestion Design

A20140 - WEST TREATMENT PLANT -POWER MGMT

423307 WTP Incinerator Enhancements

423491 WP ENERGY IMPROVEMENTS

A20410 - CONVEYANCE PIPELINES & STORAGE

423274 CP&S Holmes Point Rock Box

423299 CP&S No. Creek Interceptor Repair

423432 CP&S E. Channel Siphon Cathodic Protection

423194 CP&S CAMP

A20420 -CONVEYANCE PIPELINES & STORAGE-NEW FACILITIES & IMPROVEMENTS

423114 CP&S Cascade Siphon/Footbridge

423177 KIRKLAND FORCE MAIN RELOCATE

423270 CP&S Future Interceptors Ext.

423508 RWSP-ADTL PROF SERVICES

A20430 -CONVEYANCE PIPELINES & STORAGE-ODOR CONTROL

423096 CP&S Lk City Tunnel Corrosion Work

423172 CP&S Tukwila Freeway Crossing Relocation & Rehab.

423193 PRIMARY SED TANK REHAB RTP

423354 CP&S Juanita Bay FM Replacement

423433 CP&S S. Magnolia Outfall Replacement

A20510- CONVEYANCE PUMP STATION-ASSET MGMT FACILITIES & IMPROVEMENTS

423320 Matthews Park PS - Variable Speed Drives

423435 Swey/WMich RS Pavement Replace.

A20530 - CONVEYANCE PUMP STATIONS-ODOR CONTROL

423438 atthews Ventilation

A20810 - BIOSOLIDS-ASSET MGMT

423535 Biosolids Property Acquisition

A20820 - BIOSOLIDS-NEW FACILITIES & IMPROVEMENTS

423326 WPTP - Sludge Process Improvements

A20920 - REUSE

423384 RECLAIMED WATER PRODUCT CHARACTERIZATION

A21100 - CENTRAL FUNCTIONS

423149 IBIS CONVERSION BALANCE

423287 AQUA FILE SERVER

423294 RELOCATE COMPUTER ROOM GATEWAY

423419 FLEET-CAR REPLACEMENT

423449 LABOR SETTLEMENT COSTS

423456 IBIS SYSTEM HARDWARE

Construction Projects Completed in 2002

A20000 - South Treatment Plant

423485 STP Treatment Plant Landscape Upgrade

423509 STP Study Chemical Storage Facility Upgrade

423560 South - Power Reliability

423133 STP Renton III

A20100 - West Point Treatment Plant

423328 WTP - Digester Cleaning System

423333 WTP - ICS Gate Modifications

423379 WTP High-Solids Centrifuge

423413 WTP Drying Building Modifications

423510 ASWTP Clarifier Bldg Roof Replacement

423378 WTP West Point Odor Improvements

423246 Electrical Equipment

423304 WTP Miscellaneous Utility System Monitoring

423332 WTP 480V Breaker Trip Indication

A20400 - Conveyance pipes and storage

423121 CP&S Madsen Creek Sewer Erosion

423107 CP&S Mill Creek Relief Sewer

423122 CP&S South Interceptor

423272 CP&S Swamp Creek Sewer Trunk

423345 CP&S Wilburton Siphon Expansion

423507 CP&S Bear Creek Interceptor Extension

423473 CP&S Boeing Creek Trunk H2S Repair

A20500 - Conveyance pump station

423192 Yarrow Bay PS - Pump & Drive Replacement

423218 Acoustic Upgrades

423227 Lake City RS Permanent Odor Control Unit

423467 Kenmore Chemical Injection

423469 Sweylocken Discharge Odor Upgrade

423470 Mobil Odor Control Units

423471 North Portal Odor Control

423155 Sunset/Heathfield PS - Emergency Gen.

423396 Standby Generator Loadbanks

A20600 - Combined Sewer Overflow (CSO) control

423489 Carkeek Overflow Reduction

A20900 - Water reuse

423483 Water Reuse Technology Demonstration

Construction Projects to be Completed in 2003

A20000 - South Treatment Plant

423234 STP EDRP - Power Equipment Replacement

423408 STP Fuel Cell Demonstration

423567 Structural repairs to earthquake damaged facilities

A20100 - West Point Treatment Plant

423323 WTP - Process Safety & Risk Management

423334 WTP - Sump Pump Wiring Modifications

423388 WTP - Digester Roof Anti-Rotation Device

423305 WTP Stepping Power Factor Filter/Cap

423426 Power Reliability

A20400 - Conveyance pipes and storage

423524	CP&S S.W Lk. WA. Int. Rehabilitation
423420	CP&S E. Side Interceptor Section 1 Repair
423439	CP&S Fremont Siphon Odor Control
423468	CP&S ESI Chemical Injection
423568	No. Cr. Forcemain discharge odor control

A20500 - Conveyance pump station

423341	PLC Replacement/Offsite Facilities
423455	Univ. Reg. Station Odor Control
423154	South Mercer PS - Emergency Generator
423003	Ravenna Creek Separation

A21000 - Environmental laboratory

423459	Environmental Laboratory Expansion